Space Weather Forecast

Issued on Friday 1 November 2024 at 01:17 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate to High solar activity with Moderate flares expected, and a chance of further Strong flares. S1 Minor Solar Radiation Storm slowly easing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High following a peak Strong flare at 31/2120 UTC from the sunspot AR3878 in the northeast. There are twelve sunspot regions, consisting of ten numbered and two unnumbered regions. AR3878 is the most significant flare source, with a complex magnetic structure. AR3876 in the southwest is now showing some signs of decay and maturing into a simpler region. AR3875 in the northwest continues to show some slight growth. AR3869 in the southwest has shown some slight enhancement in recent hours and continues to display opposite polarity to what would be expected for a southern disc sunspot. Additionally, a new unnumbered spot is forming in the southwest, south of AR3876. The remaining regions are relatively stable and simpler in structure.

No clearly Earth-directed CMEs (coronal mass ejections) were observed in available imagery. No notable CME has yet to be observed from the recent Strong flare.

Solar Wind / Geomagnetic Activity: Ongoing fast winds were observed to start. Solar wind speeds were elevated, generally around 550 km/s but highly variable. Winds saw a generally decreasing trend to current slightly elevated levels of around 450km/s, briefly interrupted by the arrival of a weak CME at 31/1930 UTC. The Interplanetary Magnetic Field (IMF), Bt, was predominantly weak, but saw an increase to moderate levels following CME arrival. The important north-south component, Bz, initially varying weekly became more persistently and moderately negative following CME arrival, before returning to weekly positive values in recent observations. Geomagnetic activity was Quiet to Unsettled (Kp1-3), but with an Active (Kp4) interval to end the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at S1 Minor Radiation Storm levels throughout, but with a slowly easing trend.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate or High activity is expected to continue into the start of the period, with occasional Moderate flares expected and a chance of further isolated Strong flares. By day 3 (3 Nov) onward flare risk perhaps reducing somewhat.

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Solar Wind / Geomagnetic Activity: There are no further CME arrivals currently expected, however given the number of active sunspot regions on the disc, this may change at short notice. Mainly Unsettled to Active geomagnetic conditions expected to start, and a slight chance of a G1 Minor Storm given CME influence. Activity currently expected to decline towards Quiet levels though day 1 into day 2 (01-02 Nov). There is a slight chance of Active to G1 Minor Storms from later on day 2 (02 Nov), should connection to a faster solar wind occur, but with a greater likelihood of connection by day 3 (03 Nov).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is expected to continue easing, thought likely to fall below the S1 Minor Radiation Storm level through day 1 (01 Nov). However, any further notable flares will bring the potential for further enhancement.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	70	70
Very Active	R3-R5 (X Class)	Yes	30	30	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	Yes	90	30	20	20
Very Active	**≥ S3 ***	No	5	5	5	5
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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